CLAIMS

1. (amended) An anhydrous ammonia fertilizer flow control apparatus comprising;

a separation chamber, for separating gaseous ammonia from liquid ammonia including a head space in a top end of a separation chamber, a quieting section in the separation chamber below the top end, and a stand pipe;

the top end of the separation chamber includes a gaseous ammonia discharged valve that is open to discharge gaseous ammonia from the separation chamber and that is closed in response to the level of liquid ammonia reaching a selected liquid height within the separation chambers;

the quieting section includes an entry passage, with an entry passage area transverse to a flow direction, for receiving a mixture of gaseous ammonia and liquid ammonia from an ammonia storage tank and wherein the quieting section has a quieting section area, perpendicular to a flow of liquid ammonia through the quieting section, that is at least two times the entry passage area to slow the velocity of gaseous ammonia and liquid ammonia and permit the gaseous ammonia to separate from liquid ammonia and rise into the head space;

the stand pipe includes a stand pipe upper end connected to a downstream end of the quieting section, a stand pipe lower end and a stand pipe ammonia exit passage spaced below the head space; and

a liquid ammonia pump connected to the standpipe ammonia exit passage.

2. (amended) An anhydrous ammonia fertilizer flow control apparatus, as

set forth in claim 1, wherein the gaseous ammonia discharge valve includes a valve body, a spool ~~holder support~~ housing attached to the valve body and having a spool passage with an open first passage end, an open second passage end and a gas exit passage intersecting the spool passage;

a spool slidably mounted in the spool passage for sliding movement between an open position in which the gas exit passage is open and a closed position in which the gas exit passages closed; and

a float connected to the spool and operable to slide the spool to a closed position in response to a decrease in the volume of the gas in the headspace.

3. (original) An anhydrous ammonia fertilizer control apparatus, as set forth in claim 2, wherein the float is connected directly to the spool and the spool moves with the float as the level of liquid ammonia in the separation chamber moves up and down.

4. (original) An anhydrous ammonia fertilizer flow control apparatus, as set forth in claim 3, wherein the spool slides in the spool passage along a generally vertical path.

5. (amended) An anhydrous ammonia fertilizer flow control apparatus, as set forth in claim 1, including a manifold attached to a pump outlet of the liquid ammonia pump and a plurality of flexible hoses each of which is connected to the manifold and to one of a plurality of nozzles that inject ammonia

into the ground.

6. (original) An anhydrous ammonia fertilizer flow control apparatus, as set forth in claim 5, wherein each of the plurality of nozzles is mounted on an earth working tool that forms a slot in the ground.

7. (original) An anhydrous ammonia fertilizer flow control apparatus, as set forth in claim 6, wherein the earth working tool is a knife mounted on an applicator frame.

8. (original) An anhydrous ammonia fertilizer flow control apparatus, as set forth in claim 1, wherein the stand pipe has a stand pipe ammonia flow path cross-section area that is smaller than the quieting section area.

9. (amended) An anhydrous ammonia fertilizer apparatus comprising

an applicator frame adapted to move across a farm ~~filed~~ field;

a plurality of soil working tools mounted on the applicator frame;

a gaseous ammonia separation chamber attached to the applicator frame and including a head space, in ~~the~~ a top end of the gaseous ammonia separation chamber, a quieting section and a stand pipe;

a gaseous ammonia discharge valve, mounted on the top end of the gaseous ammonia separation chamber, that is opened to discharge ammonia gas from the gaseous ammonia separation chamber and that is closed in response to the level of liquid ammonia reaching a selected liquid height within the separation chamber;

an entry passage, for receiving a mixture of gaseous ammonia and liquid ammonia from an ammonia storage tank, through a quieting section wall, and wherein the quieting section has a diameter that is at least twice the diameter of the entry passage;

a stand pipe upper end attached to a discharge end of the quieting section and a stand pipe discharge opening through a stand pipe lower end and wherein the stand pipe discharge opening is spaced below the head space a distance sufficient to create a static head that maintains an ammonia pressure at the discharge opening that is above the anhydrous ammonia saturation pressure;

an ammonia liquid pump connected to the standpipe discharge opening;

a manifold attached to a pump discharge of the ammonia liquid pump for dividing pump discharge into a plurality of separate ammonia streams with

substantially equal flow rates; and

a plurality of hoses each having one end connected to the manifold and a discharge end connected to a nozzle supported by the applicator frame adjacent to one of the soil working tools.

10. (original) An anhydrous ammonia fertilizer apparatus, as set forth in claim 9, wherein ammonia gas discharged from the gaseous ammonia discharge valve is conveyed by a gas conveyor hose attached to a valve discharge port and injected into the ground through a gas nozzle supported by the applicator frame adjacent to one of the soil working tools.

11. (amended) A method of applying anhydrous ammonia fertilizer to farm fields comprising:

supplying saturated ammonia in a storage tank;

employing the pressure generated by the saturated ammonia at a vaporization temperature to force ammonia gas and ammonia liquid into a separation chamber;

separating ammonia gas from the mixture of ammonia gas and liquid in the separation chamber;

removing ammonia gas from the separation chamber to reduce pressure in the ~~saturation~~ separation chamber and to control a gas head volume in the in the separation chamber;

employing an ammonia liquid head to maintain a pump inlet pressure

~~of~~ above a saturation pressure of the ammonia;

pumping ammonia from the pump inlet to a manifold and metering the ammonia from the manifold through orifices;

conveying the ammonia from the manifold through flexible hoses to a plurality of ammonia injection nozzles; and

injecting the ammonia into ~~the~~ soil.